



R&D Results update

November 2011







Three keys to living with Psa V.

**Psa-control
products**

**Tolerant
New Cultivars**

**Orchard
Management**



Psa-control products

Greenhouse Product trials





1 = 10 %



2 = 25 %

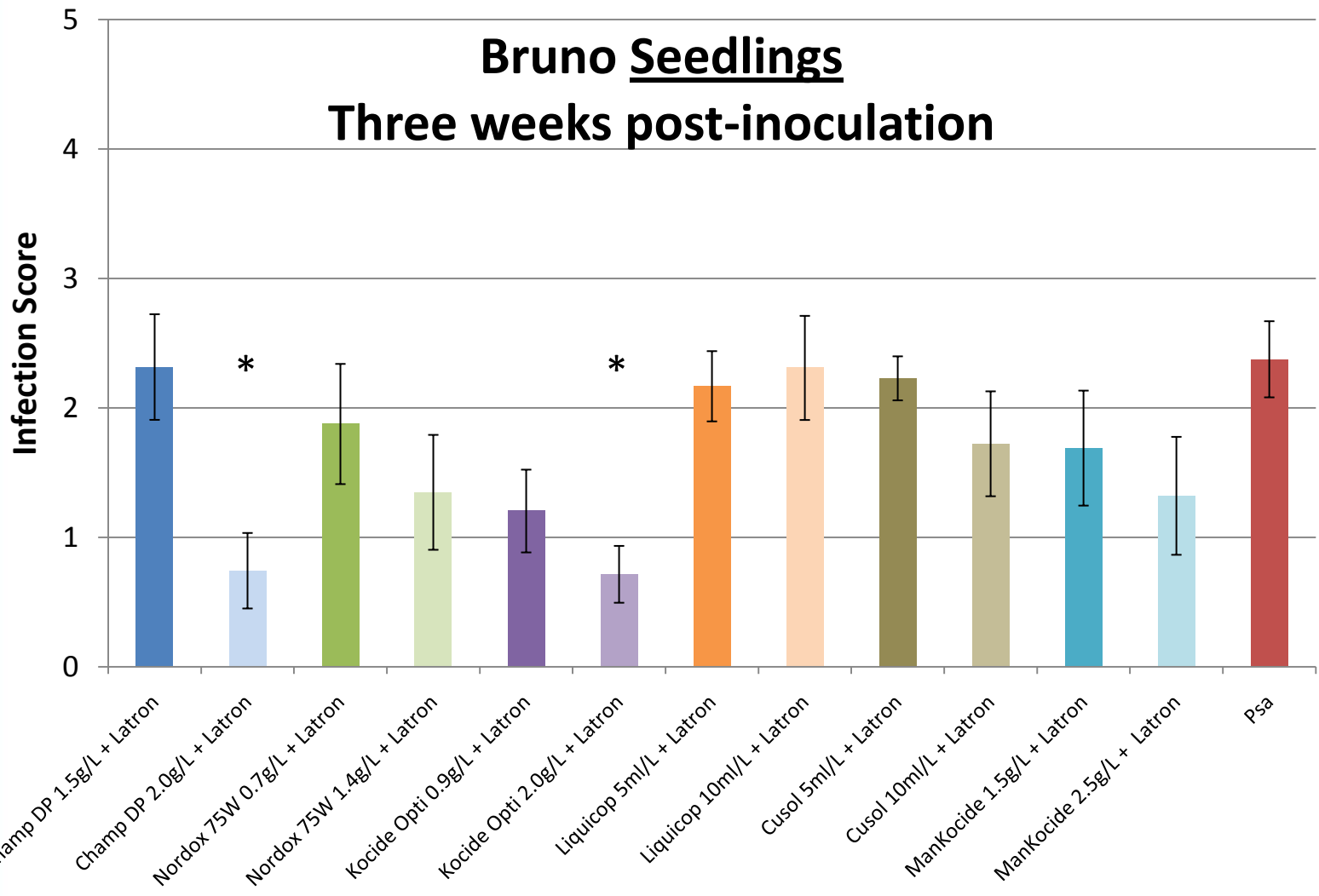


3 = 50 %



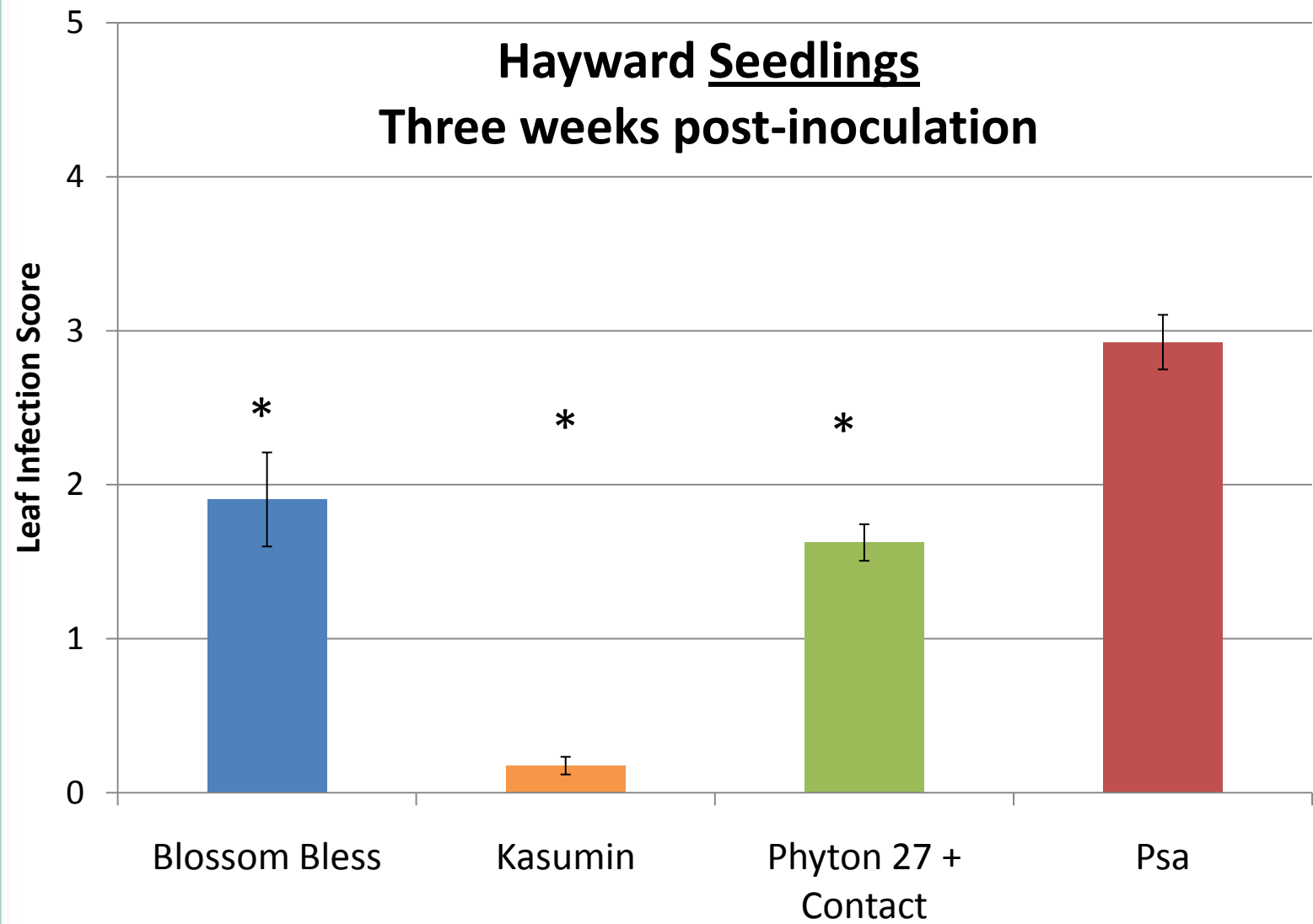
4 = 75 %

Coppers (as protectant)



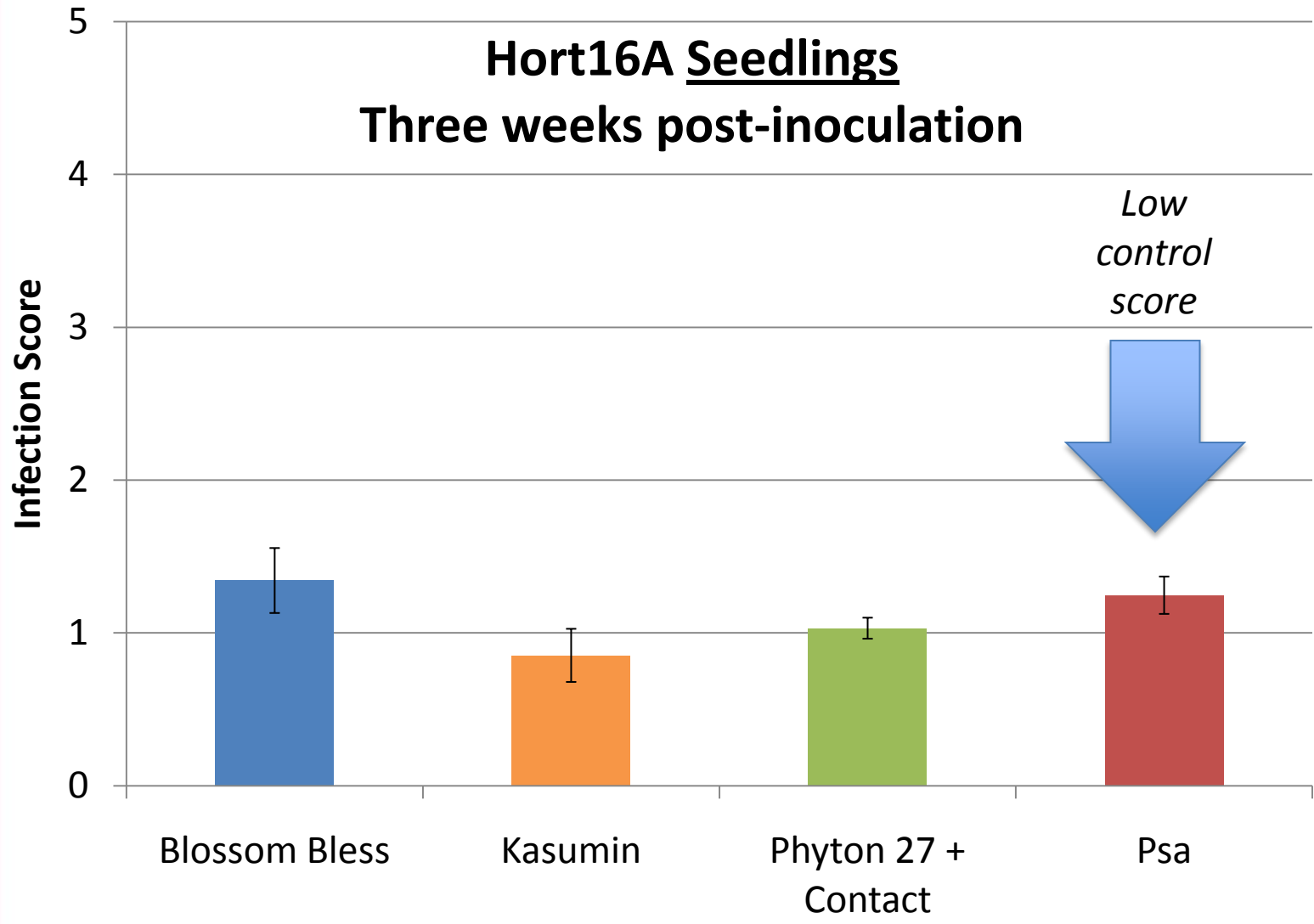
* Statistically significantly lower leaf infection compared with the Psa-V inoculated control

Other interesting products

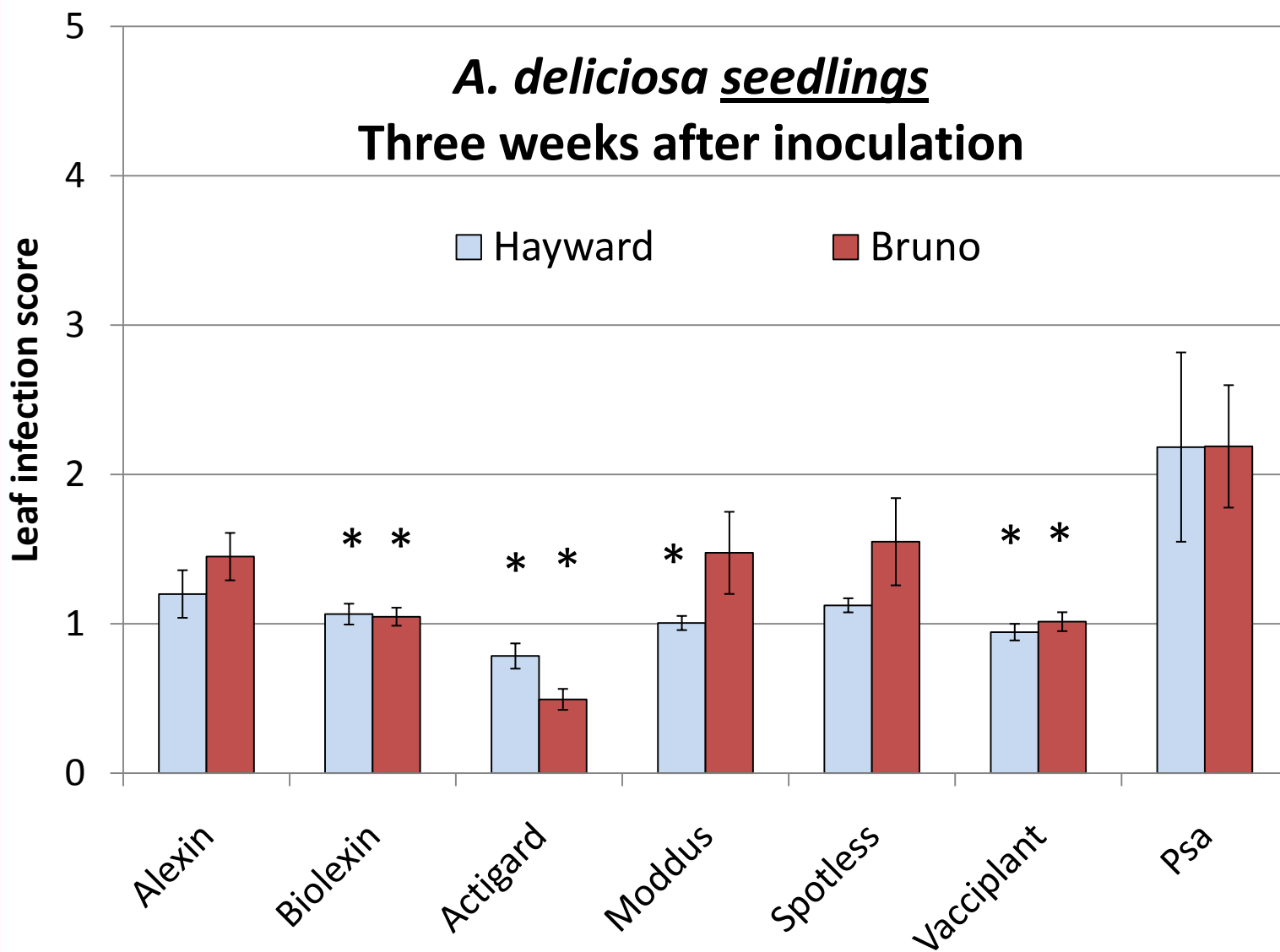


* Statistically significantly lower leaf infection compared with the Psa-V inoculated control

Other interesting products

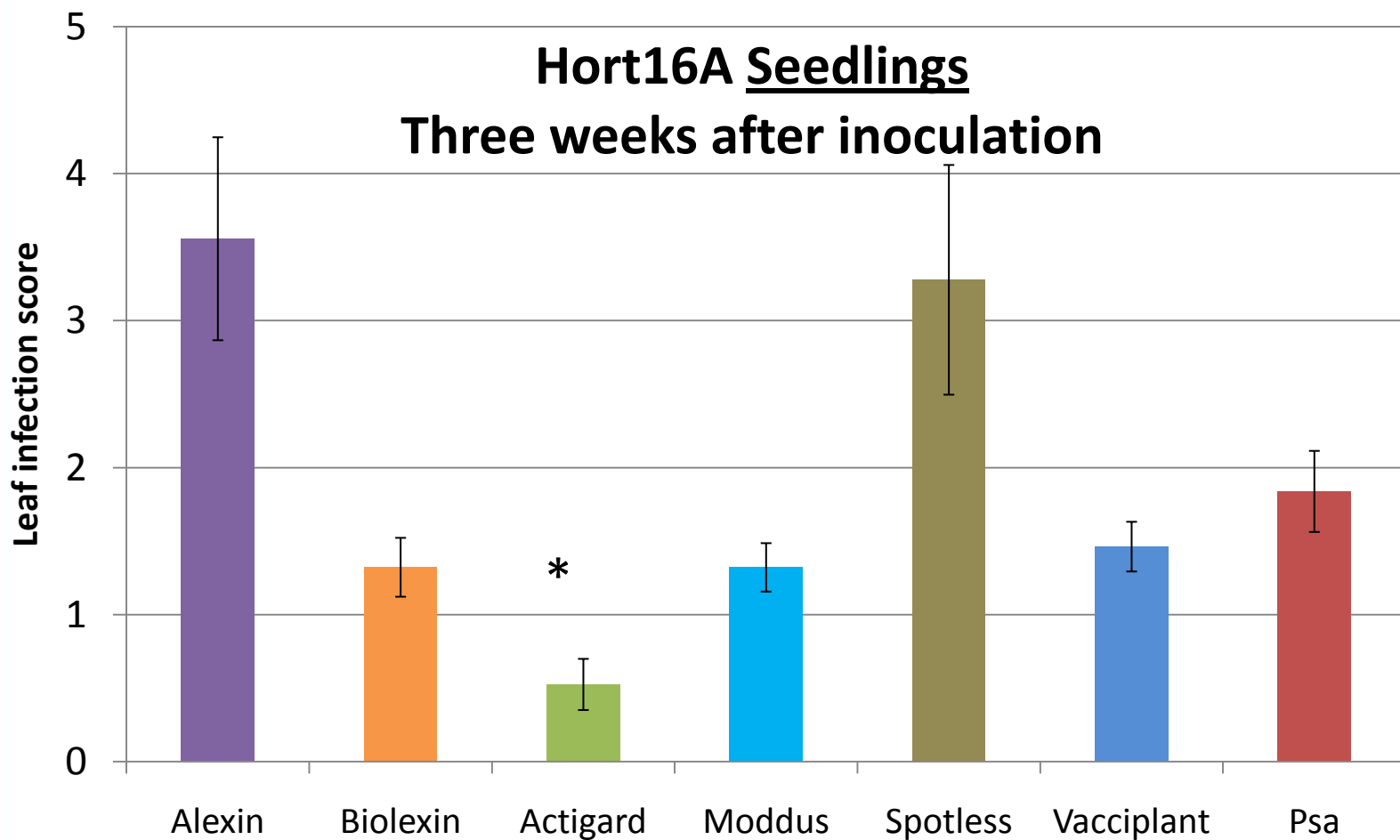


Elicitors with *A. deliciosa*.



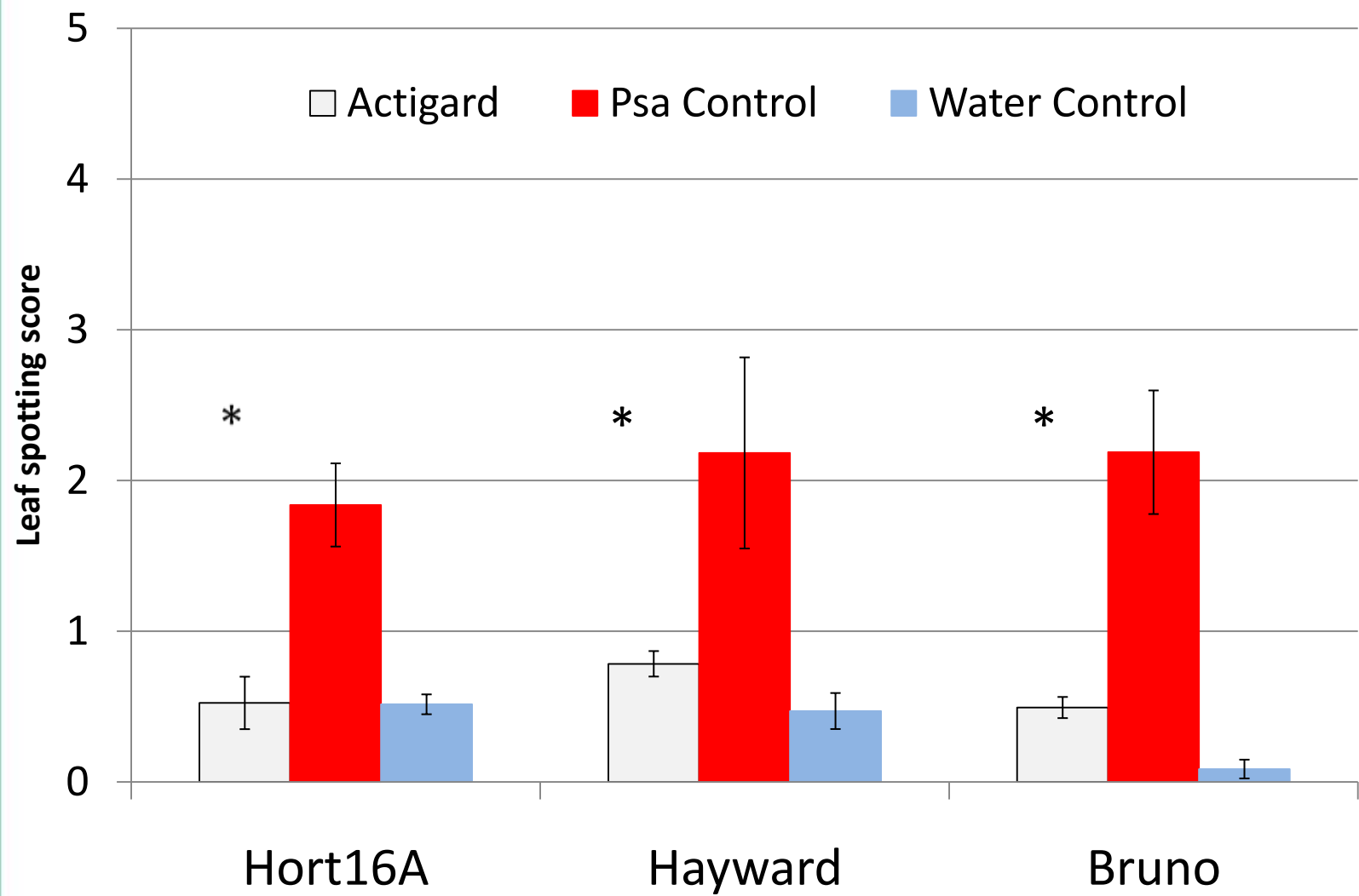
* Statistically significantly lower leaf infection compared with Psa-V inoculated control

Elicitors with *A. chinensis*



* Statistically significantly lower leaf infection compared with Psa-V inoculated control

Actigard in the greenhouse



* Actigard significantly reduced leaf spotting in comparison with Psa inoculated control – data is **21** days after inoculation



Actiguard in Italy field trials..

Percentage of Hort16A vines infected in trial area treated and untreated (soil drench)

	Actiguard™ (%)	Control (%)
All vines	10%	30%
Females	8%	30%
Males	13%	N/A

(No males in control area)

‘Real world’ evidence supports greenhouse screening approach





Actiguard impacts on Hort16A

Impact of Actiguard™ on Hort16A fruit characteristics (non-Psa infected orchard)

Treatment #	Weight (gm)	DM (%)	HUE (°)
Control	127*	15.0	112.4
Drench 150gm/ha	120	15.5	112.4
Drench 75gm/ha	118	15.5	112.3
Spray 75gm/ha	118	15.3	112.6
Spray 150gm/ha	111*	14.9	112.4

Four applications at three-weekly intervals

*Significant @ $P=0.05$ - samples collected several weeks prior to harvest.



Where next for product screening?

- Ongoing greenhouse tests.. more to test
- Field tests to validate product potential
- Test duration of protection
- Fast-track registration and supply of top products
- Test combinations and timing of applications

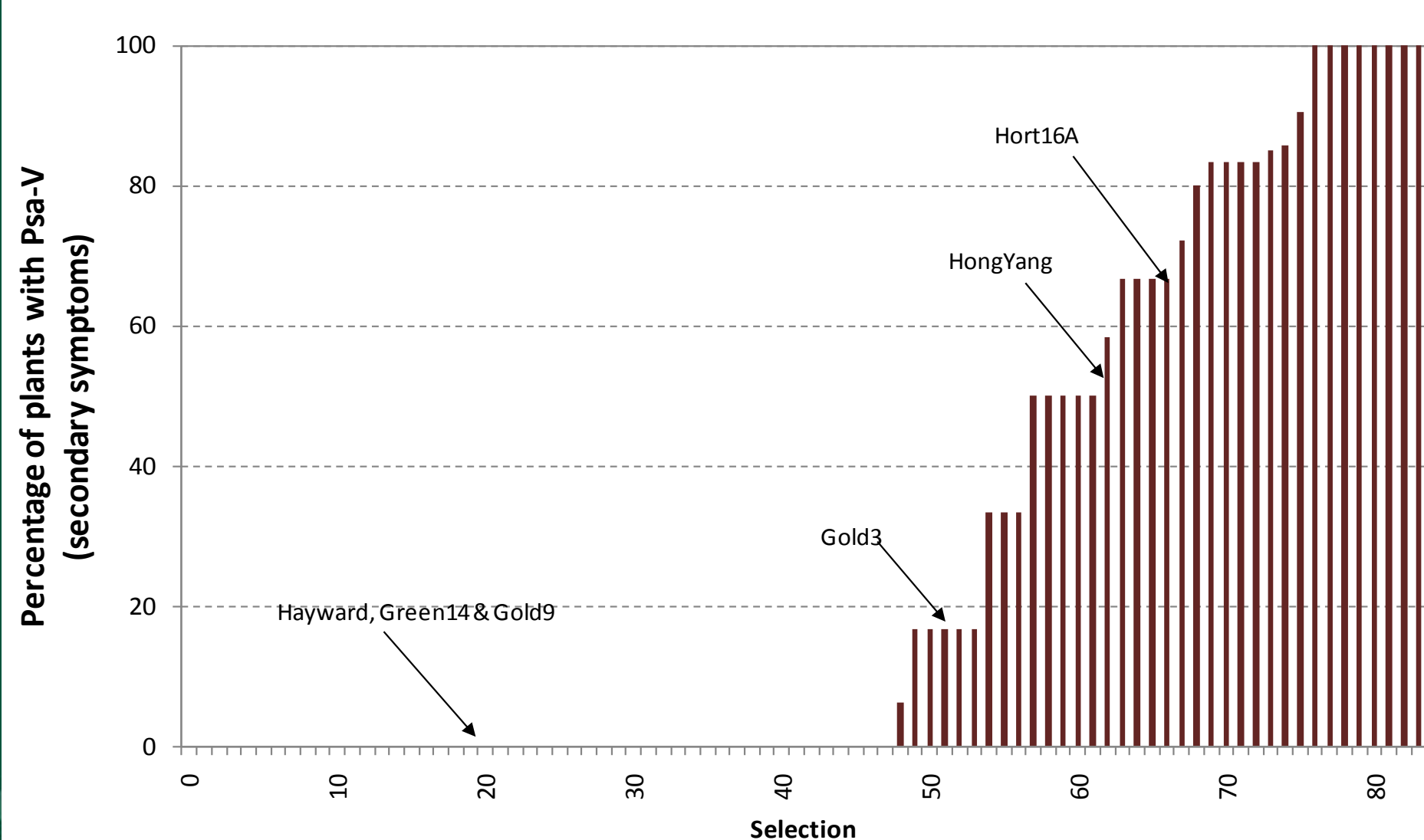


Tolerant New Cultivars



Field Observations on Susceptibility

Preliminary field observations from the Te Puke Research Orchard.

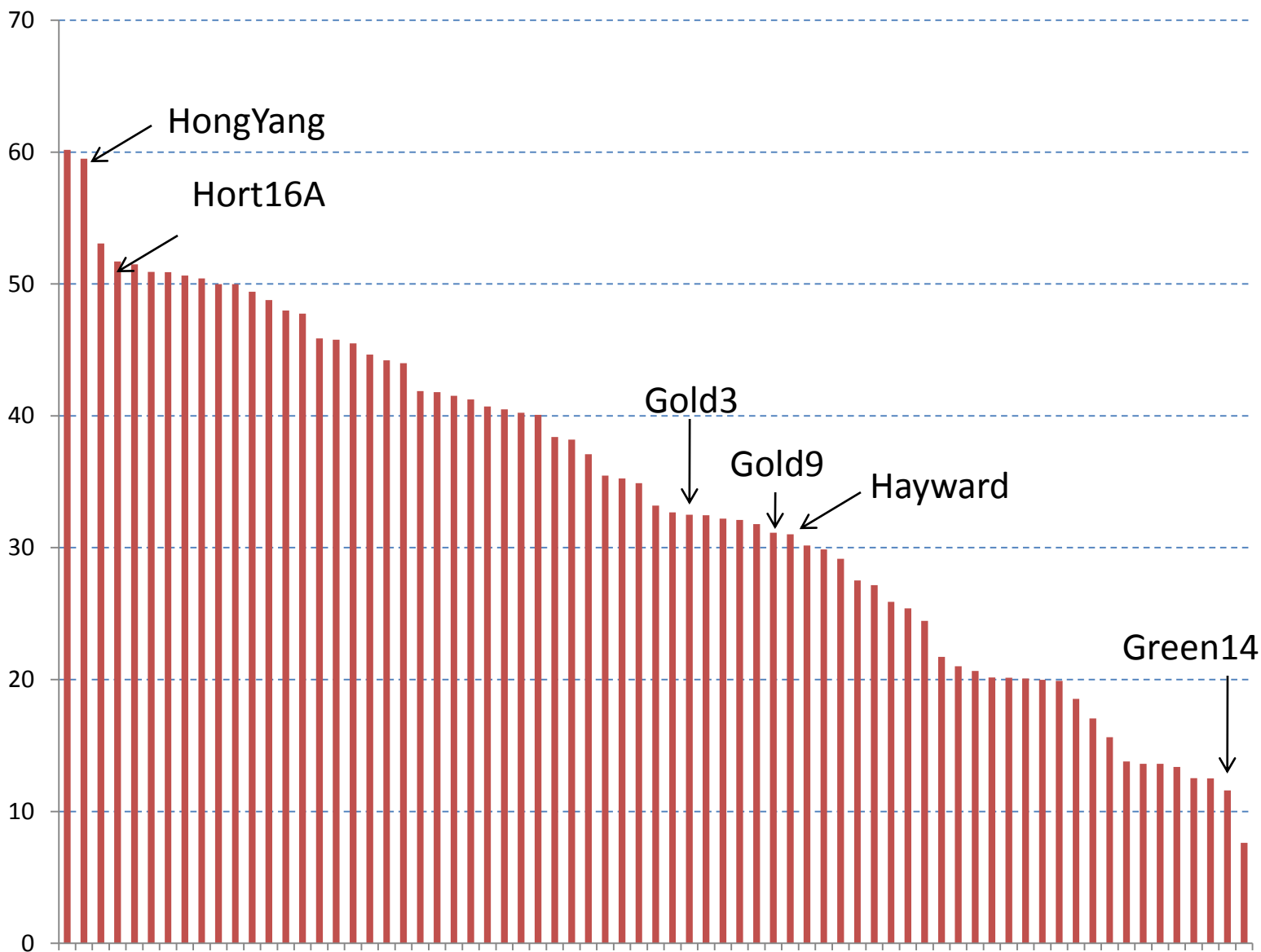


Psa-V Bioassay for tolerance





Budwood Bioassay scores (to date)



Psa-tolerant Rootstock

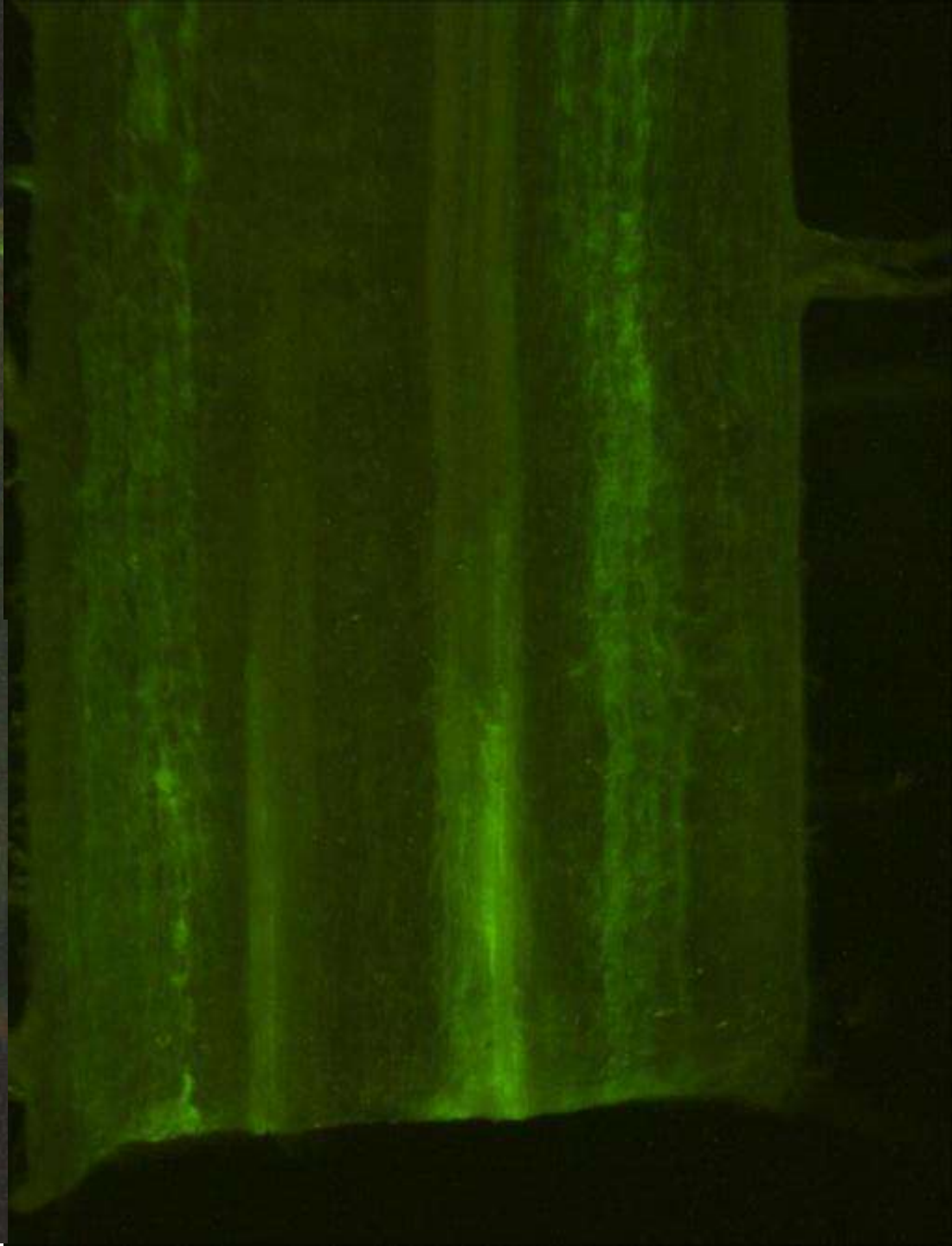


Psa canker above graft
(found with both female
and male *A. chinensis*)



Psa canker below graft
(found only on *A. chinensis*
rootstock to date)

<div>% of vines showing <u>secondary</u> symptoms of Psa-V infection</div> <div>-including cankers (red/orange exudate) and or secondary symptoms (shoot dieback, leaf spotting)</div>						
Block	Scion cultivar	Scion age (from graft)	Rootstock clone	Rootstock age (from planting)	Psa-V symptoms	
					Above graft	Below graft
GOLD	Hort16A	3	Novel	4	88	0
	Hort16A	3	Bruno sdlg	4	100	0
	Hort16A	3	Hort16A	4	88	38
	Hort16A	3	Novel	4	50	0
	Hort16A	3	Novel	4	75	0
	Hort16A	3	Novel	4	88	0
	Hort16A	3	Novel	4	88	0
RED	CK51_06	3	Novel	4	50	0
	CK51_06	3	Bruno sdlg	4	100	0
	CK51_06	3	A. chinensis	4	63	13
Male	Bruce	2	Deliciosa	4	91	0
	Meteor	2	Deliciosa	4	78	0





Psa can move to rootstock

Now screening for Psa tolerant rootstock.



		cane	258.22.1						
		cane	258.21.1						
cane	255.20.1	cane	258.20.1	cane	259.20.1	cane	260.20.1	cane	261.20.1
cane	255.19.1	cane	258.19.1	cane	259.19.1	cane	260.19.1	cane	261.19.1
cane	255.18.1	cane	258.18.1	cane	259.18.1	cane	260.18.1	cane	261.18.1
cane	255.17.1	cane	258.17.1	cane	259.17.1	cane	260.17.1	cane	261.17.1
cane	255.16.1	cane	258.16.1	cane	259.16.1	cane	260.16.1	cane	261.16.1
cane	255.15.1	cane	258.15.1	cane	259.15.1	cane	260.15.1	cane	261.15.1
cane	255.14.1	cane	258.14.1	cane	259.14.1	cane	260.14.1	cane	261.14.1
cane	255.13.1	cane	258.13.1	cane	259.13.1	cane	260.13.1	cane	261.13.1
cane	255.12.1	cane	258.12.1	cane	259.12.1	cane	260.12.1	cane	261.12.1
trunk	255.11.1	cane	258.11.1	cane	259.11.1	cane	260.11.1	cane	261.11.1
trunk	255.10.1	cane	258.10.1	cane	259.10.1	trunk	260.10.1	cane	261.10.1
trunk	255.9.1	cane	258.9.1	cane	259.9.1	trunk	260.9.1	trunk	261.9.1
trunk	255.8.1	trunk	258.8.1	cane	259.8.1	trunk	260.8.1	trunk	261.8.1
trunk	255.7.1	trunk	258.7.1	trunk	259.7.1	trunk	260.7.1	trunk	261.7.1
trunk	255.6.1	trunk	258.6.1	trunk	259.6.1	trunk	260.6.1	trunk	261.6.1
trunk	255.5.1	trunk	258.5.1	trunk	259.5.1	trunk	260.5.1	trunk	261.5.1
trunk	255.4.1	trunk	258.4.1	trunk	259.4.1	trunk	260.4.1	trunk	261.4.1
trunk	255.3.1	trunk	258.3.1	trunk	259.3.1	trunk	260.3.1	trunk	261.3.1
trunk	255.2.1	trunk	258.2.1	trunk	259.2.1	trunk	260.2.1	trunk	261.2.1
trunk	255.1.1	trunk	258.1.1	trunk	259.1.1	trunk	260.1.1	trunk	261.1.1
	Vine 1		Vine 2		Vine 3		Vine 4		Vine 5

Orchard Management

Tip squeezing looks OK



In the field - Tip Squeezing did not appear to increase the risk of infection over no tip squeezing

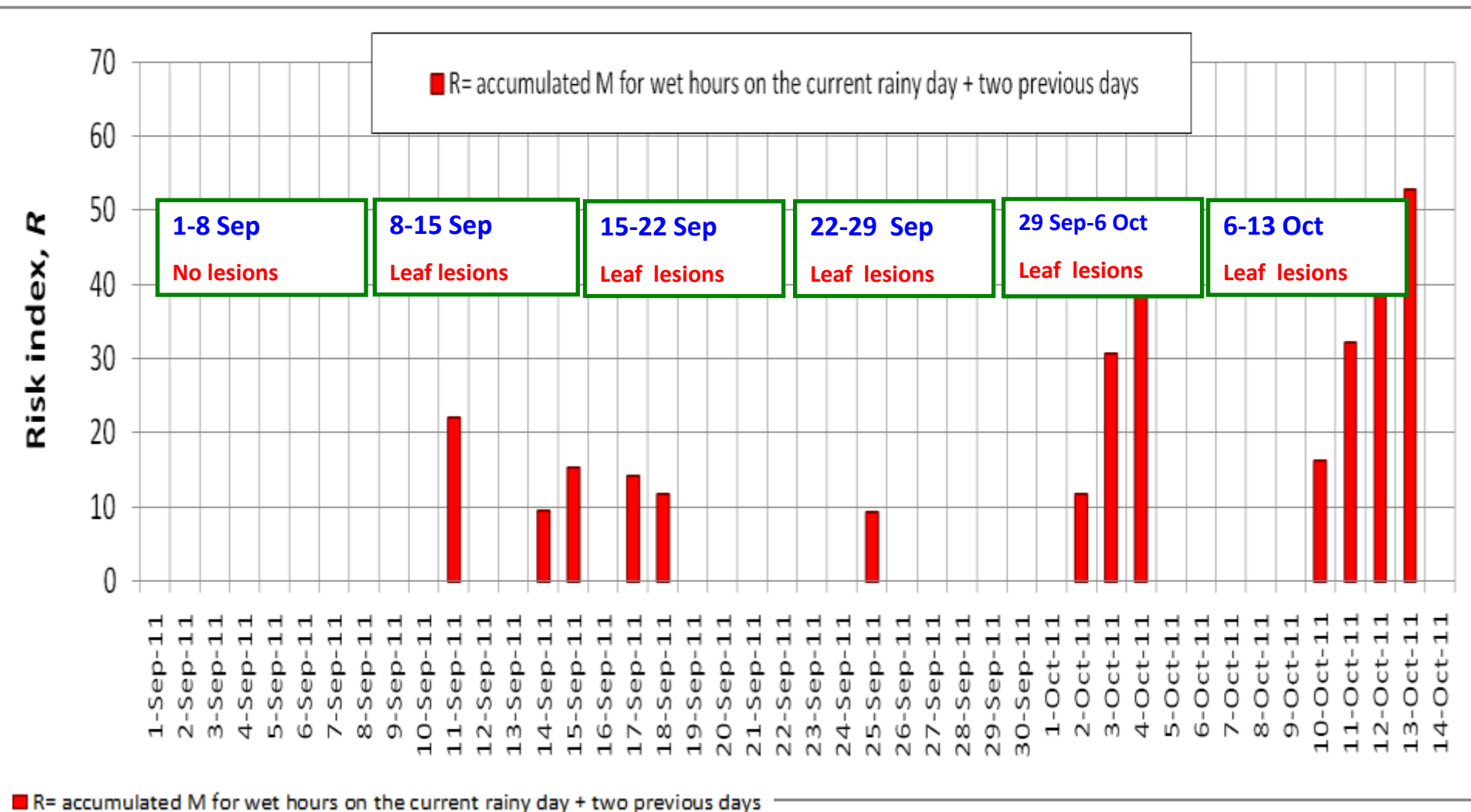
French Trials Results S. Brun & S. Max. Oct Research Kiwifruit Journal	Showing more infection in August than June	Showing same level of infection in June and August
Vine with some tip squeezing	23%	77%
Vine with no tip squeezing	27%	73%

Understanding Timing of Product Application

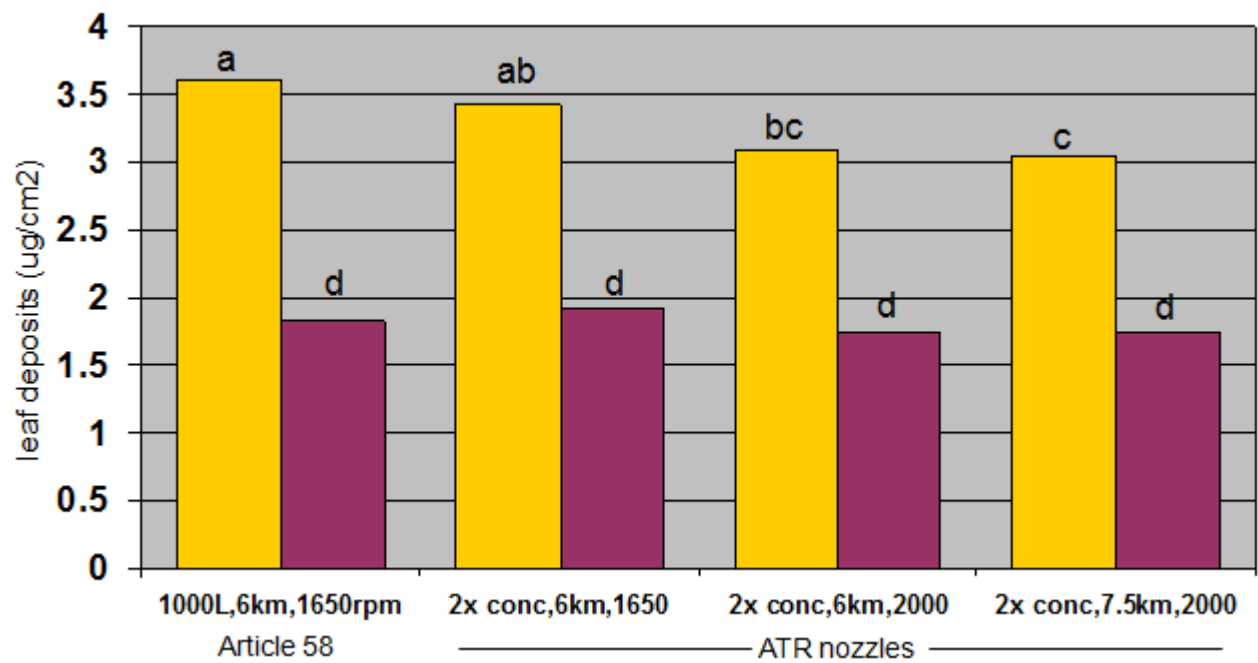
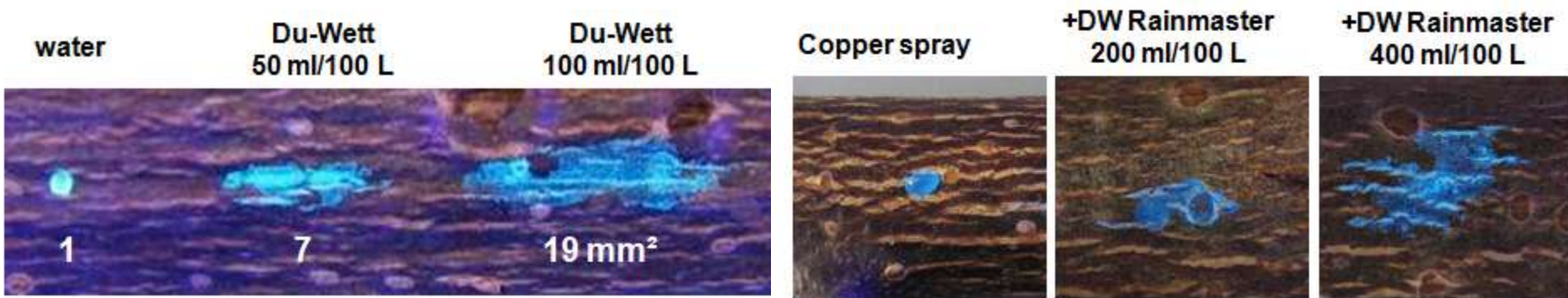




Understanding Timing of Product Application



Application Technology improving..



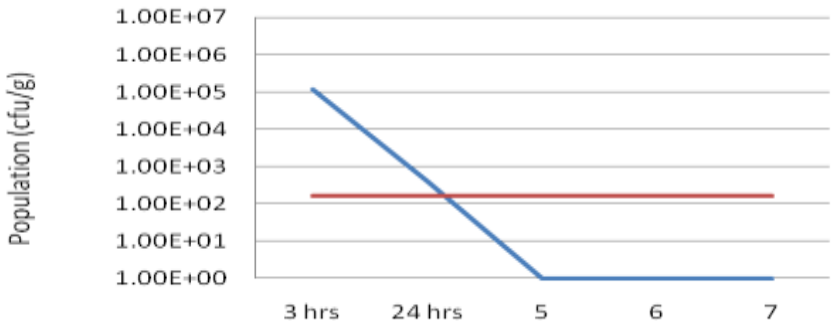
Sources of inoculum



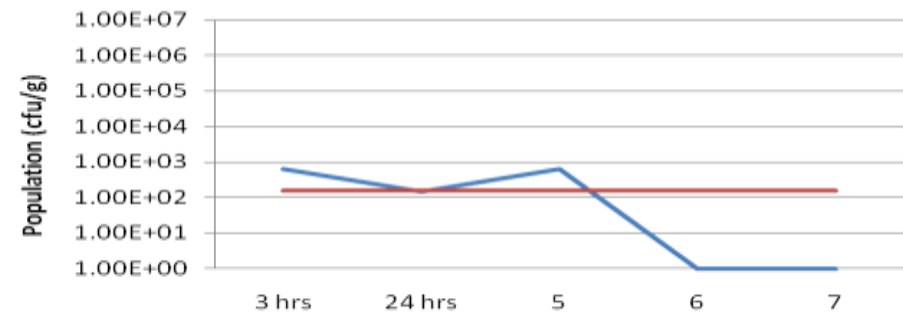
- Psa-V found in at least 25% of leaves after 14 weeks
- Winter pruning also harbour Psa
- Levels declined over time...

Sources of inoculum

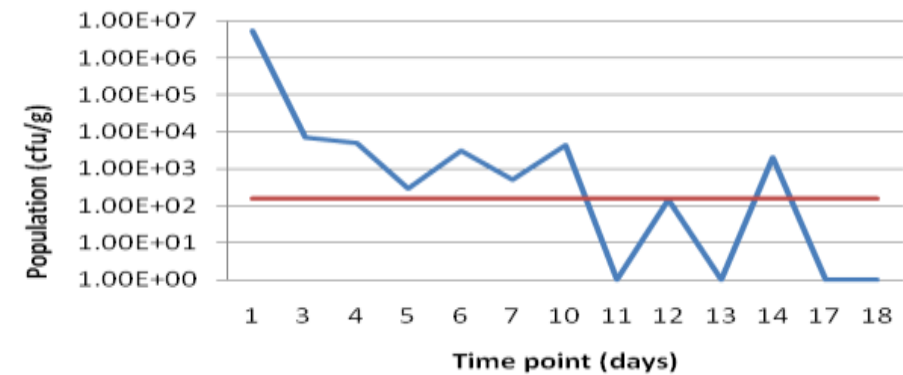
Pine



Casuarina




Cryptomeria





Where can I get more information

01 Home	02 Notice Board	03 Grower & Industry Tool Box	04 Maps, Statistics & Protocols	05 Research & Development	06 Newsroom	07 About KVH, Links & Contacts
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Information for New Zealand kiwifruit grower *Pseudomonas syringae* pv. *actinidiae* (Psa).

Our mission is to minimise the impact of Psa-V on the New Zealand kiwifruit industry and enable affected growers to re-establish their orchards.

Research projects & reports

Product testing

SmartKiwi projects



Latest news

03.06.11

Priority zone boundary change

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02.06.11

KVH weekly Psa Bulletin for growers

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01.06.11

Psa prevention road signs

Important information

Winter programme for Psa management (03.06.11)

The Winter programme for Psa management and an associated Winter canopy management guide to mitigate Psa risk are now available:

- [Winter programme for Psa management](#)
- [Winter canopy management to mitigate risk of Psa \(07.06.11\)](#)
- [Orchard hygiene](#)
- [Psa monitoring](#)
- [Identification of Psa symptoms](#)
- [Cutting and disposal](#)

Quick find information

- [Calendar of events](#)
- [Spray information](#)
- [Industry protocols and materials](#)
- [Find your regional coordinator](#)
- [Q & As](#)
- [Forms](#)

What is Psa?

Protection

How do I protect my orchard from Psa? Click [here](#) for information

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Testing

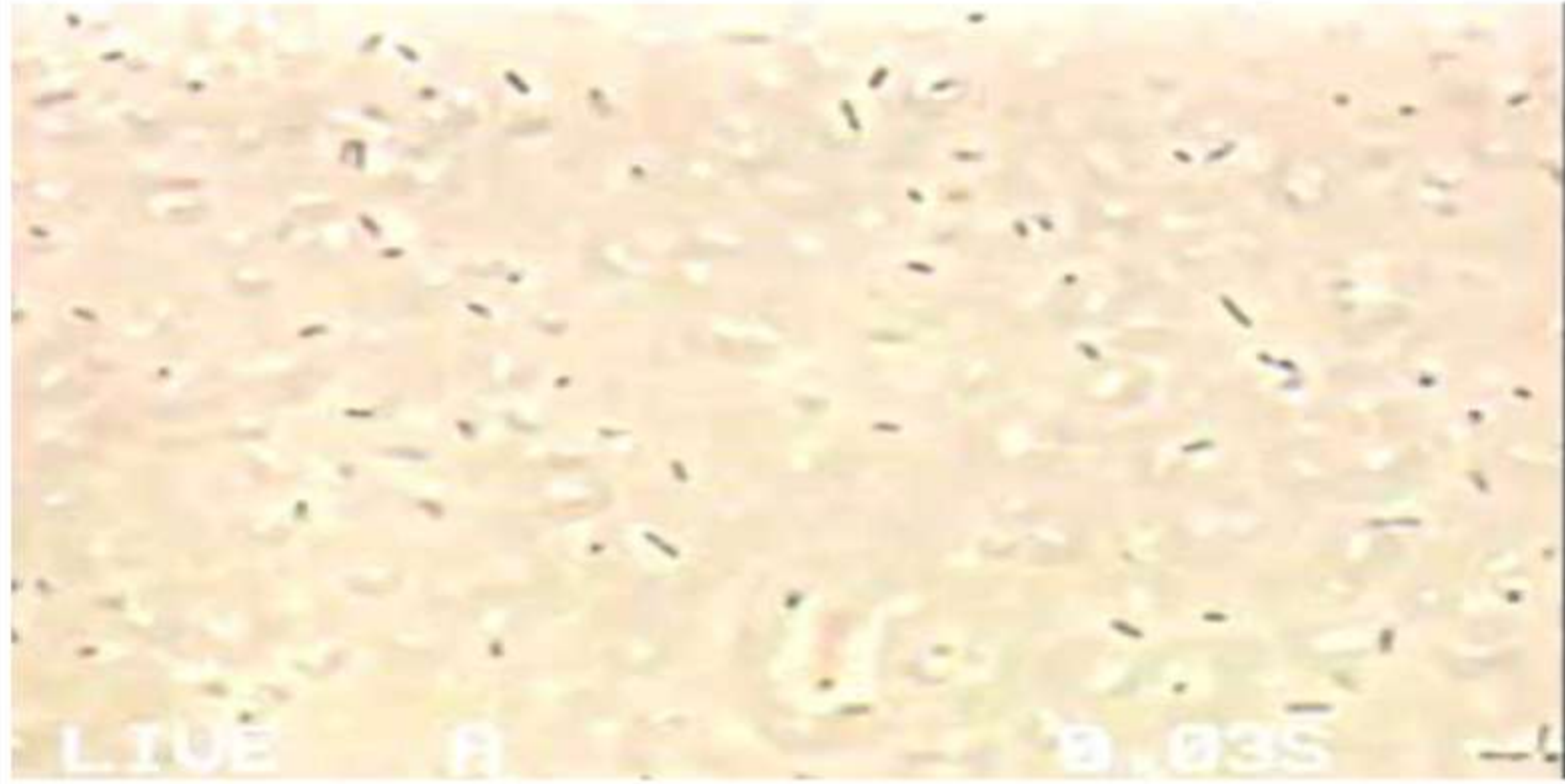
What do I do if I think I have Psa? Click [here](#) for information

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Psa Positive

What happens now? Click [here](#) for information





Questions?

